# PATENT ABSTRACTS OF JAPAN

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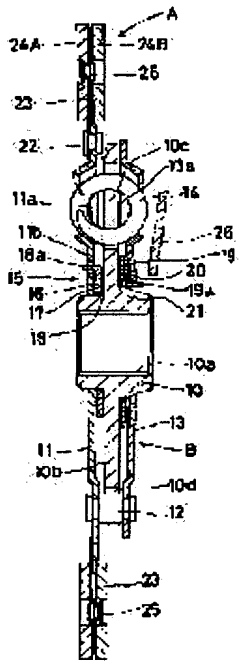
## (54) DAMPER DISK

(57)Abstract:
PURPOSE: To provide a damper disk having a large hysteresis difference between at the time of small torque fluctuation and at the time of large torque fluctuation.
CONSTITUTION: A hysteresis, when torque small fluctuates, is generated by two friction material plates 17, 21 of low coefficient of friction, and a hysteresis, when torque large fluctuates, is generated by the friction material plates 17, 21 of low coefficient of friction and a single friction material plate 18 of high coefficient of friction.

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* NOTICES *



1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] the 1 side of the flange really formed in the periphery of a hub with the inner spline gear tooth for connecting with a follower shaft, and this hub -- a hub -- relativity -- with the disk plate which bearing is carried out pivotable and connected with a driving shaft The subdisk plate connected so that it may be arranged possible possible [ a hub and relativity ] at the side besides said flange and may really rotate to said disk plate by the connection pin of hub shaft orientations, The elastic member for torque transmission arranged between the torque-transmission sides of the pair formed in the torque-transmission side, said disk plate, and said subdisk plate of the pair formed in said flange, In the absorber disk equipped with the hysteresis device inserted between the inner circumference approach part of said flange, and the inner circumference approach part of said both disk plates said hysteresis device The 1st thrust plate made insertion between said flanges and said disk plates, Said disk plate and said hub this 1st thrust plate either The 1st connection means which connects only a predetermined include angle free [ to hub shaft orientations / relative displacement ] free [ relative rotation ] to a member, Said 1st thrust plate and said 1st low coefficient-of-friction friction material plate inserted between members on the other hand, The high coefficient-of-friction friction material plate inserted between said disk plate, any of said hub or an another side member, and said 1st thrust plate, The 2nd thrust plate inserted between said flanges and said subdisk plates, The 2nd connection means connected with hub shaft orientations free [ relative displacement ] although this 2nd thrust plate is always rotated really to said subdisk plate, The spring member inserted in the condition of having bent between said 2nd thrust plate and said subdisk plates, The absorber disk characterized by being what consists of the 2nd low coefficient-of-friction friction material plate inserted between said 2nd thrust plate and said flanges.

[Translation done.]

## DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] Invention of this application relates to a suitable absorber disk to apply to the clutch disc of the friction clutch inserted between the engine of the drive system of an automobile, and an owner stage type gearing change gear etc. about the absorber disk which absorbs the torque of a torque-transmission system.
[0002]
[Description of the Prior Art] The absorber disk applied to the clutch disc of the friction clutch of an automobile A hub with the inner spline gear tooth for connecting with a follower shaft slack change gear input shaft as everyone knows, the 1 side of the flange really formed in the periphery of this hub -- a hub -- relativity -- with the disk plate which bearing is carried out pivotable and connected with a driving shaft The subdisk plate connected so that it may be arranged possible possible [ a hub and relativity ] at the side besides said flange and may really rotate to said disk plate by the connection pin of hub shaft orientations, The elastic member for torque transmission arranged between the torque-transmission sides of the pair formed in the torque-transmission side, said disk plate, and said subdisk plate of the pair formed in said flange, It comes to have the hysteresis device inserted between the inner circumference approach part of said flange, and the inner circumference approach part of said both disk plates.
[0003] As for the hysteresis device in the above-mentioned absorber disk, it is desirable that the big hysteresis for absorbing effectively the large torque fluctuation seen when intermittence actuation of the clutch is carried out, and the small hysteresis for absorbing effectively small torque fluctuation like engine torque fluctuation can be generated.
[0004] As a conventional absorber disk which can meet this request, the thing of a publication is mentioned to JP,61-201933,A. The hysteresis device in this absorber disk The 1st and 2nd high coefficient-of-friction friction material plates are arranged on both sides of the flange of a hub. The 1st thrust plate is inserted between the high coefficient-of-friction friction material plates and subdisk plates which have been arranged to the subdisk plate side of a flange. Only a predetermined include angle connects this 1st thrust plate free [ to hub shaft orientations / relative displacement ] free [ relative rotation ] to a subdisk plate. The 2nd thrust plate is inserted between this 1st thrust plate and a subdisk plate. Although this 2nd thrust plate is really rotated to the 1st thrust plate, it connects with hub shaft orientations free [ relative displacement ]. A low coefficient-of-friction friction material plate is inserted between this 2nd thrust plate and a subdisk plate. Come to insert a spring in the condition of having bent, among both thrust plates, or the 1st and 2nd high coefficient-of-friction friction material plates are arranged on both sides of the flange of a hub. The 1st thrust plate is inserted between the high coefficient-of-friction friction material plates and subdisk plates which have been arranged to the subdisk plate side of a flange. Only a predetermined include angle connects this 1st thrust plate free [ to hub shaft orientations / relative displacement ] free [ relative rotation ] to a subdisk plate. A low coefficient-of-friction friction material plate is inserted between this 1st thrust plate and a subdisk plate. The 2nd thrust plate is inserted between the high coefficient-of-friction friction material plates and disk plates which have been arranged to the disk plate side of a flange.

Although this 2nd thrust plate is really rotated to a disk plate, it connects with hub shaft orientations free [ relative displacement ], and it comes to insert a spring in the condition of having bent, between this 2nd thrust plate and disk plate. Since these hystereses device is generating the hysteresis with two high coefficient-of-friction friction material plates and one low coefficient-of-friction friction material plate, it has the description that a setup of a hysteresis is easy (a design value is acquired stably), and component part mark can be managed with six points.

[0005]

[Problem(s) to be Solved by the Invention] However, it sets on the above-mentioned conventional absorber disk. At the time of small torque fluctuation That is, when a disk plate and a subdisk plate carry out relative rotation in the range of under a predetermined include angle to a hub, a hysteresis is generated with a low coefficient-of-friction friction material plate and one high coefficient-of-friction file plate (high coefficient-of-friction file plate located between the flange of a hub, and a disk plate). Since a hysteresis is generated with two high coefficient-of-friction file plates when the time of big torque fluctuation, i.e., a disk plate, and a subdisk plate carry out relative rotation across the predetermined include-angle range to a hub The difference of the hysteresis at the time of small torque fluctuation and the hysteresis at the time of big torque fluctuation can seldom be enlarged.

[0006] Since there is a limit in the upper limit of coefficient of friction of a high coefficient-of-friction file plate, or the minimum of coefficient of friction of a low coefficient-of-friction friction material plate from the point of the quality of the material etc., that the difference of the hysteresis at the time of small torque fluctuation and the hysteresis at the time of big torque fluctuation is not made greatly has the small width of face of the transfer torque which can be adapted, and when the transfer torque of an absorber disk differs, possibility that the configuration of a hysteresis device must be changed increases.

[0007] Invention of this application aims at offering the absorber disk which can enlarge the difference of the hysteresis at the time of small torque fluctuation, and the hysteresis at the time of big torque fluctuation compared with the conventional absorber disk.

[0008]

[Means for Solving the Problem] The absorber disk concerning invention of this application according to the above-mentioned purpose the 1 side of the flange really formed in the periphery of a hub with the inner spline gear tooth for connecting with a follower shaft, and this hub -- a hub -- relativity -- with the disk plate which bearing is carried out pivotable and connected with a driving shaft The subdisk plate connected so that it may be arranged possible possible [ a hub and relativity ] at the side besides said flange and may really rotate to said disk plate by the connection pin of hub shaft orientations, The elastic member for torque transmission arranged between the torque-transmis sion sides of the pair formed in the torque-transmission side, said disk plate, and said subdisk plate of the pair formed in said flange, It is the absorber disk equipped with the hysteresis device inserted between the inner circumference approach part of said flange, and the inner circumference approach part of said both disk plates. Said hysteresis device The 1st thrust plate made insertion between said flanges and said disk plates, Said disk plate and said hub this 1st thrust plate either The 1st connection means which connects only a predetermined include angle free [ to hub shaft orientations / relative displacement ] free [ relative rotation ] to a member, Said 1st thrust plate and said 1st low coefficient-of-friction friction material plate inserted between members on the other hand, The height coefficient-of-friction friction material plate inserted between said disk plate, any of said hub or an another side member, and said 1st thrust plate, The 2nd thrust plate inserted between said flanges and said subdisk plates, The 2nd connection means connected with hub shaft orientations free [ relative displacement ] although this 2nd thrust plate is always rotated really to said subdisk plate, It consists of the 2nd low coefficient-of-friction friction material plate inserted between the spring member inserted in the condition of having bent between said 2nd thrust plate and said subdisk plates, and said 2nd thrust plate and said flange.

[0009] Although the thing of a resin system is suitable as the quality of the material of a low coefficient-of-friction friction material plate and the thing of a rubber system is suitable as the quality of the material of a high coefficient-of-friction friction material plate, it is not limited to these.

[0010] Moreover, from a viewpoint which enlarges width of face of the transfer torque which can be adapted, in order the ratio of the hysteresis at the time of small torque fluctuation and the hysteresis at the time of big torque fluctuation has desirable more than twice and to do in this way, the ratio of coefficient of friction of low coefficient-of-friction friction material and coefficient of friction of a high coefficient-of-friction friction material plate is made into 3 or more times.
[0011]
[Function] In the absorber disk like the above, the torque inputted into the disk plate from the driving shaft is transmitted to the flange of a hub through an elastic member from a disk plate and a subdisk plate, and is transmitted to a follower shaft from a hub, and when an elastic member carries out elastic deformation according to transfer torque, a disk plate and a subdisk plate carry out relative rotation to a hub. and A disk plate and a subdisk plate receive a hub according to torque fluctuation being small. When carrying out relative rotation by predetermined include-angle within the limits and the 2nd low coefficient-of-friction friction material plate rubs against the flange of a subdisk plate, the 2nd thrust plate which really rotates, or a hub, a small hysteresis occurs. A disk plate and a subdisk plate receive a hub according to torque fluctuation being large. The predetermined include-angle range The 1st thrust plate which the 1st low coefficient-of-friction friction material plate a disk plate and really rotates at the same time the 2nd low coefficient-of-friction friction material plate rubs against the flange of a subdisk plate, the 1st thrust plate which really rotates, or a hub, when exceeding and carrying out relative rotation Or when [ said ] it rubs against a member on the other hand and a high coefficient-of-friction friction material plate rubs against said another side member or 1st thrust plate, a large hysteresis occurs.
[0012] Thus, since a hysteresis when torque fluctuation is small occurs with two low coefficient-of-friction friction material plates and a hysteresis when torque fluctuation is large occurs with two low coefficient-of-friction friction material plates and one height coefficient-of-friction friction material plate, The difference of a hysteresis when torque fluctuation is small, and a hysteresis when torque fluctuation is large A hysteresis when torque fluctuation is small occurs with one low coefficient-of-friction friction material plate and one height coefficient-of-friction friction material plate. It is what can do a hysteresis when torque fluctuation is large greatly compared with the conventional absorber disk it was made to be generated with one low coefficient-of-friction friction material plate and two height coefficient-of-friction friction material plates. Consequently, the width of face of applicable transfer torque becomes large, and the design of the absorber disk of transfer torque which is different, without changing the fundamental configuration of a hysteresis device is attained.
[0013]
[Example] Hereafter, the example of the absorber disk concerning invention of this application is explained based on drawing.
[0014] Drawing 1 - drawing 4 show the 1st example, and are the clutch disc of the friction clutch of an automobile. The facing 24A and 24B of the pair which is a friction material plate is fixed by the rivet 25 on both sides of the flat spring 23 with a wave of a large number which fixed by the rivet 22 in the periphery section of the disk plate 11 of the absorber disk B, and Facing 24A and 24B is fastened by spring action in the state of clutch connection as everyone knows between the engine flywheels and pressure plates as a driving shaft which are not illustrated, and a clutch disc A has this fastening canceled in a clutch cut off state.
[0015] The hub 10 with inner spline gear-tooth 10a for connecting the absorber disk B with the input shaft of the owner stage gearing change gear which is not illustrated as a follower shaft, the 1 side (it is left-hand side at drawing 1 ) of flange 10b really formed in the periphery of this hub 10 -- a hub 10 -- relativity -- with the disk plate 11 by which bearing is carried out pivotable The subdisk plate 13 connected so that it may be arranged possible possible [ a hub 10 and relativity ] at the side besides flange 10b and may really rotate to a disk plate 11 by four connection pins 12 of hub shaft orientations, Four apertures 11a formed in the torque-transmission side, the disk plate 11, and the subdisk plate 13 of a pair which are formed by the end face of the pair estranged to the absorber disk hoop direction of four apertures 10c formed in flange 10b, Four compression coil springs 14 arranged between the torque-transmission sides of the pair formed by the end face of the pair estranged to 13a

absorber disk hoop direction (elastic member for torque transmission), It has the hysteresis device 15 inserted between the inner circumference approach part of flange 10b, and the inner circumference approach part of both the disk plates 11 and 13.

[0016] Four connection pins 12 have penetrated 10d of notching formed in the periphery section of flange 10b of a hub 10, and the maximum of the twist include angle of both the disk plates 11 and 13 to a hub 10 is specified by contacting one of the end faces of the pair estranged to the absorber disk hoop direction whose connection pin 12 is 10d of notching.

[0017] Clearance delta is given between the compression coil springs 14 and the top end faces of aperture 10c of flange 10b which are located in left-hand side by drawing 2 . The clearance same also between the compression coil spring 14 located in right-hand side by drawing 2 and the lower limit side of the aperture of a flange is given. In a twist of negative, the property of a torque-twist angle changes on the way (when both the disk plates 11 and 13 carry out relative rotation counterclockwise to a hub 10 by drawing 2 ).

[0018] The 1st thrust plate 16 with which the hysteresis device 15 is made insertion between flange 10b and a disk plate 11, The high coefficient-of-friction friction material plate 18 inserted between this 1st thrust plate 16 and flange 10b, The 1st low coefficient-of-friction friction material plate 17 inserted between the 1st thrust plate 16 and a disk plate 11, The 2nd thrust plate 19 made insertion between flange 10b and the subdisk plate 13, It has the 2nd low coefficient-of-friction friction material plate 21 inserted between the spring member 20 inserted in the condition of having bent between this 2nd thrust plate 19 and the subdisk plate 13, and the 2nd thrust plate 19 and flange 10b.

[0019] Four claw part 19a which engages with four notching 13b formed in the inner circumference of the subdisk plate 13 is formed in the inner circumference of the 2nd thrust plate 19. The width of face of claw part 19a is the width of face and the abbreviation EQC of notching 13b, and migration to the absorber disk radial of the 2nd thrust plate 19 to the subdisk plate 13 is regulated by forming four claw part 19a and four notching 13b at intervals of 90 degrees. Moreover, although the 2nd thrust plate 19 really rotates to the subdisk plate 13 by engagement to claw part 19a and notching 13b, it is connected free [ migration to absorber disk shaft orientations ]. In order that only the predetermined include angle theta may connect the 1st thrust plate 16 free [ to hub shaft orientations / relative displacement ] free [ relative rotation ] to a disk plate 11, four claw part 16a which engages with four square hole 11b formed in the disk plate 11 is formed in the periphery of the 1st thrust plate 16. Width of face of claw part 16a is made smaller than the width of face of square hole 11b, and the 1st thrust plate 16 is connected to the disk plate 11 free [ migration to absorber disk shaft orientations ] free [ relative rotation ] only for the predetermined include angle theta.

[0020] In the clutch connection condition, an engine output torque is inputted into a disk plate 11 through Facing 24A and 24B, and this torque is transmitted to flange 10b of a hub 10 through the compression coil spring 14 from a disk plate 11 and the subdisk plate 13, and is transmitted to the input shaft of an owner stage type gearing change gear from a hub 10. According to transfer torque, the compression set of the compression coil spring 14 is carried out, and a disk plate 11 and the subdisk plate 13 carry out relative rotation (twist) to a hub 10.

[0021] The torque-twist angle property and hysteresis of a clutch disc A are shown in drawing 5 . In a certain torque level of the transfer TOKURU level which changes variously, according to torque fluctuation being small A disk plate 11 and the subdisk plate 13 receive a hub 10. The 1st low coefficient-of-friction friction material 17 at the same time the 2nd low coefficient-of-friction friction material plate 21 rubs against flange 10b of the subdisk plate 13, the 2nd thrust plate 19 which really rotates, or a hub 10, when carrying out relative rotation within the limits of the predetermined include angle theta The 1st thrust plate 16 Or the small hysteresis H1 (refer to drawing 5 ) occurs by rubbing against a disk plate 11. A disk plate 11 and the subdisk plate 13 receive a hub 10 according to torque fluctuation being large. The range of the predetermined include angle theta The high coefficient-of-friction friction material plate 18 at the same time the 2nd low coefficient-of-friction friction material plate 21 rubs against flange 10b of the subdisk plate 13, the 2nd thrust plate 19 which really rotates, or a hub 10, when exceeding and carrying out relative rotation The 1st thrust plate 16 Or by rubbing against flange 10b, the large hysteresis H2 (refer to drawing 5 ) occurs.

[0022] Drawing 6 shows the 2nd example and the difference in the configuration to the 1st example Four claw part 16b formed in the periphery of the 1st thrust plate 16 so that each aperture 10c may be followed at flange 10b of a hub 10 Although relative rotation is free only for a predetermined include angle to a hub 10 in the 1st thrust plate 16 by making it engage with 10f (for it to have larger width of face than the width of face of claw part 16b) of four formed notching, it connects free [ migration to absorber disk shaft orientations ]. It is in the point which inserted the high coefficient-of-friction friction material plate 17 between the 1st thrust plate 16 and a disk plate 11, and inserted the 1st low coefficient-of-friction friction material plate 18 between the 1st thrust plate 16 and flange 10b. Other configurations are the same as the 1st example.
[0023] In this 2nd example A disk plate 11 and the subdisk plate 13 receive a hub 10 according to torque fluctuation being small. The 1st low coefficient-of-friction friction material 17 at the same time the 2nd low coefficient-of-friction friction material plate 21 rubs against flange 10b of the subdisk plate 13, the 2nd thrust plate 19 which really rotates, or a hub 10, when carrying out relative rotation within the limits of the predetermined include angle theta The 1st thrust plate 16 Or a small hysteresis occurs by rubbing against flange 10b of a hub 10. A disk plate 11 and the subdisk plate 13 receive a hub 10 according to torque fluctuation being large. The range of the predetermined include angle theta The high coefficient-of-friction friction material plate 18 at the same time the 2nd low coefficient-of-friction friction material plate 21 rubs against flange 10b of the subdisk plate 13, the 2nd thrust plate 19 which really rotates, or a hub 10, when exceeding and carrying out relative rotation A disk plate 11 Or a large hysteresis occurs by rubbing against the 1st thrust plate 16.
[0024] Since the 2nd example is making claw part 16b of the 1st thrust plate 16 engage with 10f of notching of flange 10b with large thickness, it can make low planar pressure of the contact section with flange 10of claw part 16b b compared with the 1st example, and can make endurance over wear high.
[0025] Moreover, the member 26 shown with the two-dot chain line in drawing 1 is the releasing lever section of a well-known diaphragm spring, and the condition of drawing shows the condition of it having been most pushed in for clutch cutoff and having approached the clutch disc A. As shown in both the above-mentioned examples, it is advantageous to insert only the 2nd thrust plate 19, the spring member 20, and the 2nd low coefficient-of-friction friction material plate 21 between flange 10b and the subdisk plate 13 among the members which constitute a hysteresis device, when avoiding interference with the releasing lever section.
[0026] In the two examples explained above, although engagement to claw parts 16a and 19a and Notching 11a, 13a, and 10f was made to perform connection to thrust plates 16 and 19, a disk plate 11, the subdisk plate 13, and flange 10a, it is not limited to this and can change suitably.
[0027]
[Effect of the Invention] As explained above, the absorber disk concerning invention of this application Since a hysteresis when torque fluctuation is small occurs with two low coefficient-of-friction friction material plates and a hysteresis when torque fluctuation is large occurs with two low coefficient-of-friction friction material plates and one height coefficient-of-friction friction material plate, The difference of a hysteresis when torque fluctuation is small, and a hysteresis when torque fluctuation is large A hysteresis when torque fluctuation is small occurs with one low coefficient-of-friction friction material plate and one height coefficient-of-friction friction material plate. It is what can do a hysteresis when torque fluctuation is large greatly compared with the conventional absorber disk it was made to be generated with one low coefficient-of-friction friction material plate and two height coefficient-of-friction friction material plates. Consequently, the width of face of applicable transfer torque becomes large, and the design of the absorber disk of transfer torque which is different, without changing the fundamental configuration of a hysteresis device is attained.

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[Translation done.]

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## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]
[Drawing 1] It is drawing of longitudinal section of the 1st example of the absorber disk concerning invention of this application, and is the sectional view which meets one to 1 line in drawing 2 .
[Drawing 2] It is the partial fracture Fig. seen from the method of the right of drawing 1 .
[Drawing 3] It is the enlarged drawing of the important section of drawing 1 .
[Drawing 4] It is the partial diagrammatic view seen from the left of drawing 3 .
[Drawing 5] It is the diagram showing the torque-twist angle property and hysteresis of the 1st example.
[Drawing 6] It is drawing of longitudinal section of the 2nd example of the absorber disk concerning invention of this application.
[Description of Notations]
A ... Clutch disc
B ... Absorber disk
10 ... Hub
10a ... Inside SUPURAI gear tooth
10b ... Flange
10c ... Aperture which forms the torque-transmission side of the pair of a flange
10f ... Notching of a hub
11 ... Disk plate
11a ... Aperture which forms the torque-transmission side of the pair of a disk plate
11b ... Square hole of a disk plate
12 ... Connection pin
13 ... Subdisk plate
13a ... Aperture which forms the torque-transmission side of the pair of a subdisk plate
13b ... Notching of a subdisk plate
14 ... Compression coil spring (elastic member)
15 ... Hysteresis device
16 ... The 1st thrust plate
16a, 16b ... Claw part of the 1st thrust plate
17 ... 1st low coefficient-of-friction friction material plate
18 ... High coefficient-of-friction friction material plate
19 ... The 2nd thrust plate
19a ... Claw part of the 2nd thrust plate
20 ... Spring member
21 ... 2nd low coefficient-of-friction friction material plate

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[Translation done.]

# PATENT ABSTRACTS OF JAPAN

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| 90 4027593 | 31.08.1990 | DE |
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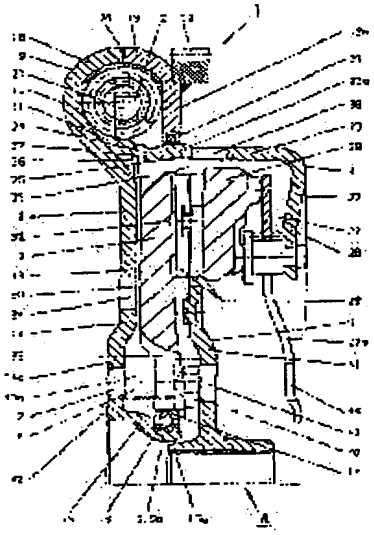
| 90 4027629 | 31.08.1990 | DE |
| 90 4041709 | 24.12.1990 | DE |
| 90 4041722 | 24.12.1990 | DE |

## (54) TORQUE TRANSMISSION DEVICE

(57)Abstract:
PURPOSE: To achieve the optimal damping ratio and the torque ratio by reducing the axial dimension of a torque transmission device so as to be used for a horizontal engine, and while improving the mutual support of fly wheel masses.
CONSTITUTION: A clutch cover 22 holds a load area of a pressure accumulator 10 of an attenuating device, and covers fly wheel masses 2, 3 for holding the cover 22.



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